

WHAT IS CLAIMED IS:

1. A QAM constellation, comprising:  
points arranged in a non-square grid to achieve a large  
5 noise margin, and  
to allow for fast convergence of blind equalization  
algorithms.
2. The QAM constellation of claim 1, wherein said points are  
10 selected to use low word widths.
3. A method for improved shell mapping comprising:  
providing a non-square grid QAM constellation and employing  
points of said constellation in said mapping.
4. A transmitter, comprising:  
a symbol mapper for receiving inputs,  
a filter for each output of said mapper, and  
a modulator for receiving said filter's outputs and  
20 providing an output signal.
5. The transmitter of claim 4, wherein said mapper employs a  
non-square grid QAM constellation.
- 25 6. A slicer for a receiver, comprising:  
a pre-programmed look-up-table for receiving I and Q  
components and generating indexes of n constellation elements, and  
a distance calculator which calculates the Euclidean  
distance from a slicer input to the n constellation elements pointed  
30 to by the look-up-table to determine the constellation element to be  
output.

7. The slicer of claim 6, wherein said distance calculator employs an adder and squaring unit.

5 8. A receiver, comprising:  
a demodulator for receiving an input signal and outputting  
a data stream,  
a filter for said data stream, and  
a slicer for converting said data stream to a constellation  
10 point.

9. The receiver of claim 8, wherein said receiver is a blind receiver employing a super exponential algorithm or a CMA.

15 10. The receiver of claim 9, wherein said constellation points are selected from  $\{0, 1, e^{2\pi j/7}, e^{4\pi j/7}, e^{6\pi j/7}, e^{8\pi j/7}, e^{10\pi j/7}, e^{12\pi j/7}\}$ .

20 11. A QAM constellation labelling method, comprising:  
labelling each point so that the Hamming distance between  
each neighboring pair is one, and  
labelling such pairs to minimizing the Hamming distance  
when the distance can not be set to one.

25 12. A method for minimizing bit error for Trellis code modulation, comprising:  
labelling uncoded bits to minimize bit error rates, and  
labelling coded bits in accordance with Trellis coding modulation while minimizing the Hamming distance between source bits.